degree of salinity. It is impossible to discuss here the various theories of fertilisation to which these astonishing experiments have given rise.

But such phenomena appear, perhaps unreasonably, all the more astounding to us, as the animals experimented on are higher in the scale; and so we may look with renewed wonderment at a phenomenon which M. Bataillon has demonstrated in the frog, and M. Henneguy has repeated and confirmed.[1] Eggs were taken from the body of a female frog, under proper antiseptic precautions and with careful simultaneous "control" experiments. The eggs were placed in a little dish, and were then carefully pricked with a tiny needle of platinum or a sharp spicule of glass, after which they were covered with a layer of water sterilised by heat. In the hands of these physiologists, the little needle was as potent (or almost as potent) as Aaron's Rod. In about four hours the eggs began to develop, but while all of them passed through some initial stages, it was about one-fifth only that segmented in the normal way. At every stage the mortality was greater than in the case of ordinary fertilised eggs, but at length, out of a thousand eggs experimented on, one hundred and twenty hatched into tadpoles, and of these three were reared through parts of their metamorphosis. They did not actually turn into frogs, but died accidentally or for want of proper nourishment after the appearance of their legs, and after the oldest (about three months old) had all its four legs well developed and its tail already beginning to disappear; it was, in short, all but a perfect frog. As with St. Denis, when he walked a short distance with his head under his arm, "ce n'est que le premier pas qui coûte"; but these tadpoles, if they did not endure to the end, went a long distance on their way.

It is all but superfluous to add that the authors of these researches are men of high standing and reputation, skilled in all the precautions necessary for the carrying out of their experiments and for safeguarding them from all sources of accidental error. In short, we may have no doubt at all that what they assert they have actually performed—that they have demonstrated the artificial fertilisation of a vertebrate ovum by a simple mechanical stimulus, and that, so to speak, they have raised a hybrid between a needle and a frog! But here we are face to face with the double *rôle* which the male plays in the process of fertilisation, for, on one hand, it is his part to give the initial impulse or stimulus to the act of development, and on the other to convey to the offspring a share of his own hereditary qualities or characteristics. In these artificial experiments of parthenogenesis the two influences are dissociated. The former one is efficiently replaced by chemical or mechanical means, but the other drops out of sight altogether. For, as a French critic has remarked, "il ne peut être question d'hérédité du côté du père, car on ne voit pas très bien les jeunes grenouilles héritant des propriétés de leur épingle paternelle"!

D. W. T.

AGRICULTURAL RESEARCH IN CEYLON.[2]

THE staff of the Royal Botanic Gardens, Ceylon, show commendable activity in investigating the planters' problems that come under their notice. At frequent intervals issues are made of the Circulars and Agricultural Journal containing their papers, which will be found to bear comparison with any publications from other experiment stations. These papers show an obvious mastery of the situation, they are conceived in a scientific spirit, and exhibit none of the looseness characteristic of amateur investigations into agricultural questions. Tea and rubber naturally come in for a good share of attention, but other crops also present their problems, many of them of considerable interest and importance.

As usual in subtropical countries, most of the problems are connected with insect and fungoid pests, and half of the present batch of publications are from the mycologist, Mr. T. Petch. Five root diseases of tea caused by fungi are described. The commonest is caused by *Ustulina zonata*, Lév.; the dead tea roots show no external mycelium, but only a few inconspicuous black spots; if the cortex is removed, however, white fan-shaped patches of mycelium are found overlying the wood. The starting points of the disease are usually the dead stumps of Grevillea, which is grown among tea, and cut down either for firewood or when it has grown too large. Another common disease is caused by *Hymenochaete noxia*, Berk., a fungus that attacks numerous other plants. Here the mycelium is external to the root, and binds up a mass of sand, earth, and small stones, thus forming a crust 3 or 4 mm. thick; in the early stages the mycelium is brown, whence the name brown root disease has been given; later on, however, the whole turns black. It is the commonest root disease of Hevea in Ceylon, but does less damage than *Fomes semitostus*; unlike the latter, it does not spread through the soil, but only along the roots of trees; hence its progress is so slow that, as a rule, the first affected tree is dead before the neighbouring trees are attacked. Another root disease of Hevea, so far uncommon, is also described. It is caused by *Sphaerostilbe repens*, B. and Br., and is characterised by the black or red flattened strands running over the surface of the wood after the cortex is removed, there being no external mycelium. *Acacia decurrens*, which has been extensively planted as a wind-break for tea or for green manuring, and for more than thirty years seemed immune from disease, has now been found to suffer from two root diseases in addition to a "gummosis," the cause of which is not yet ascertained. An agaric, *Armillaria fuscipes*, causes one root disease, and *Fomes australis* the other. Another publication deals with canker in cacao and hevea. The latter plant does not usually suffer from canker when grown alone, but it is badly affected when grown in mixed plantations with cacao, which serves as a permanent source of infection. It is concluded that both canker and pod diseases are caused by *Phytophthora faberi*, Maubl.; complete examination was, however, made of the other fungi also present.

Mr. E. E. Green describes the extraordinary outbreak of snails, *Achatina fulica*, that has occurred in part of the island, and to which reference has already been made in these columns. This snail is large, its shell being about 4½ inches long, and weighs about 4 oz. It has only recently been introduced, but it has not effected nearly so much damage as might have been expected, because it feeds on human and cattle excreta; indeed, Mr. Green considers that, on the whole, it is doing more good than harm, and does not recommend any drastic attempts at extermination. Before long the natural enemies will keep it down.

Messrs. Kelway, Bamber, and R. H. Lock give a preliminary account of their studies on the effect of different intervals between successive tappings in Para rubber. A previous investigator, Parkin, obtained an increase of more than 600 per cent. of latex by increasing the frequency of tapping; Bamber and Lock, on the other hand, find no such marked wound response, although they advise frequent tappings from the practical point of view.

The official correspondence with regard to cotton-growing in Ceylon is also published. Dr. Willis does not think there is much future for the crop; other products yielding larger profits are not likely to be displaced. There is also a useful account of various samples of Cymbopogon grass oils prepared by Mr. Jowitt, of Bandarawela, and examined at the Imperial Institute.

ABSORPTION SPECTRA OF METALLIC SALTS.[1]

THE present volume is designed as a continuation of the work of Jones and Uhler and Jones and Anderson, and gives the results of a detailed study of the absorption spectra of salts of potassium, cobalt, nickel, copper, chromium, erbium, praseodymium, neodymium, and uranium, as affected by various chemical reagents and different temperatures. For the purpose of the discussion some 3000 solutions have been examined. The main points

[1] "L'embryogénèse complète provoquée chez les Amphibiens par piqûre de l'œuf vierge," etc. Par E. Bataillon. C.R., Avril 13, 1910; Arch. de Zool. exp. et gén. (5), vi, Nov. 1910; C.R., 27 Mars, 1911.
"Sur la parthénogénèse expérimentale chez les Amphibiens." Par F. Henneguy. C.R., Avril 3, 1911.

[2] Circulars and Agricultural Journal of the Royal Botanic Gardens, Ceylon. Vol. v.

[1] "A Study of Absorption Spectra." By H. C. Jones and W. W. Strong. Pp. ix+159+98 plates. (Washington, D.C.: The Carnegie Institution, 1910.

of investigation have been the effects of the addition of free acids and foreign salts on the absorption spectra. A notable result is the discovery of well-defined "solvent bands" for various substances, for example, water, alcohols, acetone, glycerol, which do not show any appreciable absorption of visible light.

In general it is shown that the *anions* of the various coloured salts play a much less important *rôle* in modifying the spectra than the solvent. Different salts of the same anion in the same solvent usually have the same absorption spectra. As, however, the absorption spectra of the powdered salts may be very different, it is evident that the solvent has an important part in the mechanism of absorption.

On the other hand, the absorption spectra of the same salt in different solvents are often very different; Jones and Anderson have ascribed this to the formation of *solvates*, more or less stable compounds of the salt and solvent. The persistence of solvent bands varies quite widely for the different solvents, appearing to be greatest for water and less for the alcohols.

Some of the uranous salts in the various solvents, water, alcohols, acetone, and glycerol, show characteristic bands very strongly. An attempt is being made to correlate many of these well-defined phenomena with the results of the Zeeman effect on similar variations of the salts and solutions, and it is considered that the results of such investigations may lead to a much clearer knowledge of the chemistry of compounds. In some cases it is possible to break up the absorption bands into very fine bands by chemical methods, as has been done with uranyl and uranous salts in acetone solutions, the most marked example being the action of hydrochloric acid on an acetone solution of uranous chloride.

A very noticeable result is the action of free acids on the corresponding uranyl salt, *e.g.* acetic acid on the acetate, nitric acid on the nitrate, &c. In most of these cases the presence of these foreign reagents causes the uranyl bands to become more intense, and, in most cases, narrower. The action of all except nitric acid is to cause the uranyl bands to be shifted towards the red. Nitric acid, on the contrary, produces large shifts towards the violet. A very important result of this analysis is that the absorption bands gradually shift as one salt of a metal is transformed into another by the addition of free acid. This is interpreted to mean that a series of intermediate products are formed, each with its characteristic absorption spectrum, although the chemical methods at present at our disposal do not enable us to isolate them.

It is also shown that rise in temperature causes the general absorption of any salt in water to increase, and the bands to broaden and become more intense.

The authors summarise the discussion as to the bearing of this work on the solvate theory of solution.

An excellent series of ninety-eight photographic reproductions of the spectra is included in the volume.

C. P. B.

THE ROYAL SOCIETY CONVERSAZIONE.

THE ladies' conversazione of the Royal Society was held at the rooms of the society in Burlington House on Wednesday, June 14. Many objects and experiments of scientific interest were on view, but most of them were described in our account of exhibits at the previous conversazione on May 10 (NATURE, May 18, p. 394). It is unnecessary, therefore, to refer to these again. Among other exhibits at last week's function were those described in the subjoined summary of the official catalogue.

The Director, Khedivial Observatory, Helwan, Egypt.—Photographs of Halley's comet, taken with the 30-inch Reynolds reflector by Mr. H. Knox Shaw. The photographs exhibited cover the period from April 16, 1910, to June 10, 1910. *Royal Astronomical Society.*—Photographs of the planet Mars, taken by Prof. E. E. Barnard with the 40-inch telescope of the Yerkes Observatory. The photographs of September 24, 1909, show the region of the Fastigium Aryn and Margaritifer Sinus, and those of September 28 the region of the Syrtis Major.

The Director, Royal Botanic Gardens, Kew.—(1) Collection of Euphorbias, showing mimetic resemblance. The following species of Euphorbia, selected from the collections at the Royal Botanic Gardens, Kew, show remarkable resemblance in habit to plants of other natural orders to which they are in no way related botanically. The species of Euphorbia, together with the plants they resemble, were exhibited side by side.

(1)	*Euphorbia Bertheloti*	*Cotyledon lineolare.*
(2)	,, *colletioides*	*Rhipsalis micrantha.*
(3)	,, *dendroides*	Willow twigs.
(4)	,, *hystrix*	*Cereus insularis.*
(5)	,, *Intisy*	Prunus twigs.
(6)	,, *polygona*	*Cereus polygonus.*
(7)	,, *Schimperiana*	*Ceropegia fusca.*
(8)	,, *Sipolisii*	*Vitis quadrangularis.*
(9)	,, *stapelioides*	*Stapelia micrantha.*
(10)	,, sp.	Pelargonium sp.
(11)	,, *Tirucalli*	*Senecio junceus.*
(12)	,, *xylophylloides*	*Epiphyllum truncatum.*

(2) *Ficus Krishnae.* *F. Krishnae*, a remarkable species most nearly allied to *F. bengalensis*, in which the leaves are cup-shaped, the inside of the cup being formed by the under surface of the leaf. *Mr. W. Fawcett.*—A parasitic flowering plant from Jamaica (*Scybalium jamaicense*, Schott and Endl.). This species is one of the Balanophoraceæ, a family of parasitic flowering plants growing on the roots of trees in tropical forests. They do not develop chlorophyll, and are therefore altogether dependent upon their host for sustenance. The seed contains an embryo of the simplest structure, having neither cotyledons nor radicle; it germinates in the soil, the embryo grows in length, thread-like, until it touches the root of a tree, and then penetrates it. When established on the root it forms a tuberous rhizome, from which flowering stems are produced. The flowers are very small, numerous, in heads on a stalk covered with scales—male and female flowers on distinct heads. This species is found in Jamaica, Cuba, and Hispaniola. Other species occur in Brazil and Colombia. *Mr. P. S. U. Pickering, F.R.S.*—Germination of seeds in heated soil. When soil is heated there is formed in it a substance toxic towards the germination of seeds and the growth of plants. Seeds germinate more slowly and in smaller proportions the higher the temperature of heating up to 250°. By exposure to air and moisture the toxic substance is destroyed. Plants grown rapidly in previously heated soil also show the presence of a toxic substance, but after this has become decomposed, such soil, owing to increased soluble contents and altered bacterial conditions, promotes plant growth.

Dr. G. H. Rodman.—A series of stereoscopic transparencies illustrating the life-history and minute structure of the stick insect (*Bacillus rossi*). Stick insects are natives of warm climates (India, Australia, the Malay Peninsula), but with care they may be reared in this country. They resemble, as their name suggests, portions of stick, and they afford an excellent example of mimicry. The various stages during the escape of the insects from their eggs are shown. The feet are provided with a pair of sharp hooks, by which they can cling to rough surfaces, and also with a pad or sucker, which enables them to get a foothold on perfectly smooth surfaces. The eye is a compound one, and faceted. They stand prominently out from the surface of the head, and are covered at will by the insect extending his forelegs directly forward in the long axis of his body. The skin is cast several times during the growth of the insect. It is shown that the antennæ and surface of the eyes share in the desquamation of the insect. *Dr. Francis Ward.*—(1) Photographs of fish life, as seen from below the surface of the water. (2) Photomicrographs of the growth of larval fish (plaice) taken from life. The photographs are taken in a pond specially constructed for the purpose. In one wall of the pond is a large open space which communicates with an observation chamber, and between this chamber and the water in the pond is a sheet of plate glass. Concealed in the chamber, the observer can watch the fish as they appear to each other in the water. In consequence of the darkness in the chamber and the light in the pond, the glass acts as a mirror, and the fish merely sees himself and his surroundings reflected, while the observer can plainly see into the pond. It is thus possible to observe a timid fish without disturbing him. In addition, an instantaneous